Native Species, Exotic Pests, and Resistant Seed:
Role of Fire in Restoring and Sustaining Five-Needle Pine Ecosystems

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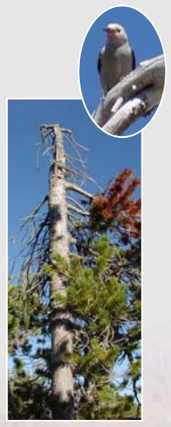
top to bottom:
SP killed by blister rust
Typical blister rust stem canker
Mountain Pine Beetle[1]

WWP killed by blister rust,
Spirit Lake, WA, 1950

WWP killed by blister rust,
Washington DNR

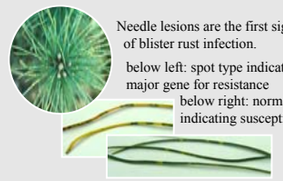
WBP on Wizard Island decimated by mountain pine beetle, dwarf mistletoe, and blister rust



Rust-damaged WBP and mutualist, Clark's Nutcracker

Boulder SP field trial
screening for rust resistance

Screening for rust resistance at
Dorena Tree Improvement Center



Needle lesions are the first sign of blister rust infection.
below left: spot type indicating major gene for resistance
below right: normal spots, indicating susceptibility

Issue

Dramatic decline in sugar pine (SP), western white pine (WWP), and whitebark pine (WBP) populations due to the exotic disease white pine blister rust, mountain pine beetle, and fire exclusion. These pines are principal serals in many systems. Restoration opportunities are available.

Available Rust-Resistant Seed

- ❖ Over 9000 sugar pine and western white pine parent trees tested
- ❖ Orchard seed offers a level of resistant seed beyond that previously available
- ❖ Resistance is not immunity from rust infection
- ❖ Breeding efforts continue to improve resistance to this non-native disease
- ❖ Seed orchards contain a diverse genetic base
- ❖ Breeding zones help ensure adaptability
- ❖ Forest Service and Bureau of Land Management orchards now producing seed

Quartz Fire Planting

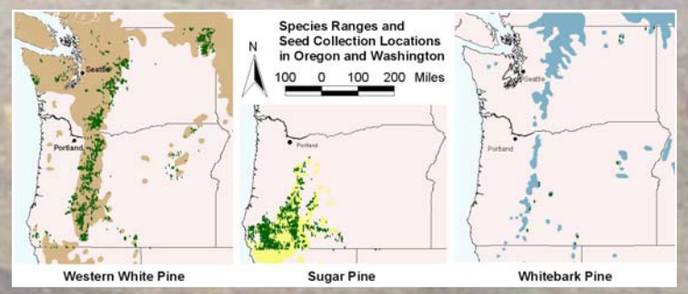
Quartz Fire

Quartz Fire

Large SP,
BLM Wolf Creek Site

Willamette
WWP Planting

Large SP with 15-yr-old
SP planting, Boulder



30 year old WWP planting,
Grass Creek

WBP on Fire[2]

National Fire Plan

"Improve community well-being and ecosystem health."

- ❖ Wildland fire and prescribed fire use
- ❖ Restore fire-adapted ecosystems to natural conditions
- ❖ Treat acres of unnatural fuel accumulations
- ❖ Funds available to restore and sustain ecosystem health.

Calf Fire Planting

Contact your local Forest Service, Bureau of Land Management or Oregon Department of Forestry offices for more information on seed availability for your area, potential use of resistant seed on your sites, and management considerations to help ensure successful establishment, restoration and sustainability of these valuable species. See www.fs.fed.us/r6/dorena for more information on the resistance program.

Prescribed Fire in Nutcracker Opening[2]

Fire Site in WBP[2]

Spring Fire Planting

Summary

- ❖ **Five-needle pines are declining in forest ecosystems**
- ❖ **Adverse impacts by non-native disease, beetle, fire exclusion, and stand density**
- ❖ **Prime restoration opportunities after wildland fires**
- ❖ **Prescribed fire as a management tool for ecosystem health**
- ❖ **Active management of these stands will help ensure success.**
- ❖ **Blister rust resistant seed are available for sugar pine and western white pine.**
- ❖ **Resistant work with whitebark pine has just begun.**

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Additional Credits: [1]Forestry Images, www.forestryimages.org
[2]Whitebark Pine Ecosystem Foundation, www.whitebarkfound.org
Species ranges are taken from maps compiled by Elbert Little, 1971, for the Forest Service, and digitized for the U.S. Geological Survey, http://climchange.cr.usgs.gov/data/atlas/little/

Background photo: Spring Fire Planting

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